

CLAIMS

1. (Amended) An anisotropically conductive connector for electrically connecting a circuit board for inspection to a wafer by being arranged on the surface of the circuit board for inspection for conducting electrical inspection of each of a plurality of integrated circuits formed on the wafer in a state of the wafer, which comprises:
- a frame plate, in which a plurality of anisotropically conductive film-arranging holes each extending in a thickness-wise direction of the frame plate have been formed correspondingly to electrode regions, in which electrodes to be inspected have been arranged, in all or part of the integrated circuits formed on the wafer, which is an object of inspection, and a plurality of elastic anisotropically conductive films arranged in the respective anisotropically conductive film-arranging holes in this frame plate and each supported by the peripheral edge about the anisotropically conductive film-arranging hole,
- wherein each of the elastic anisotropically conductive films is composed of a functional part having a plurality of conductive parts for connection formed of an elastic polymeric substance, containing conductive particles exhibiting magnetism at a high density and extending in the thickness-wise direction of the film, and arranged correspondingly to the electrodes to be inspected

in the integrated circuits formed on the wafer, which is the object of inspection and an insulating part mutually insulating these conductive parts for connection, and a part to be supported integrally formed at a peripheral edge of the functional part and fixed to the peripheral edge about the anisotropically conductive film-arranging hole in the frame plate,

wherein the conductive particles contained in the conductive part for connection in the elastic anisotropically conductive film are obtained by coating the surfaces of core particles exhibiting magnetism with a high-conductive metal, a proportion of the high-conductive metal to the core particles is at least 15 % by mass, and the thickness t of the coating layer formed of the high-conductive metal, which is calculated out in accordance with the following equation (1), is at least 50 nm, and

wherein the elastic polymeric substance forming the elastic anisotropically conductive films is a cured product of addition type liquid silicone rubber, whose compression set is at most 10% at 150°C and whose durometer A hardness is 10 to 60:

$$\text{Equation (1) } t = [1/(Sw \cdot \rho)] \times [N/(1 - N)]$$

wherein t is the thickness (m) of the coating layer formed of the high-conductive metal, Sw is a BET specific surface area (m^2/kg) of the core particles, ρ is a specific gravity (kg/m^3) of the high-conductive metal, and N is a value of (mass of the high-conductive metal/total mass of the

conductive particles).

2. The anisotropically conductive connector according to claim 1, wherein the conductive particles have an electric resistance value R of at most 0.3Ω as

5 determined by the following measuring method:

Electric resistance value R : an electric resistance value determined after preparing a paste composition by kneading 0.6 g of the conductive particles and 0.8 g of liquid rubber, arranging this paste composition between a pair of
10 electrodes each having a diameter of 1 mm and arranged so as to oppose to each other with a clearance of 0.5 mm, applying a magnetic field of 0.3 T between the pair of the electrodes, and leaving the paste composition to stand in this state until the electric resistance value between the
15 pair of the electrodes becomes stable.

3. The anisotropically conductive connector according to claim 1 or 2, wherein the conductive particles have a BET specific surface area of 10 to $500 \text{ m}^2/\text{kg}$.

4. (Deleted)

20 5. (Amended) The anisotropically conductive connector according to any one of claims 1 to 3, wherein the elastic polymeric substance forming the elastic anisotropically conductive films has a durometer A hardness of 25 to 40.

25 6. (Amended) The anisotropically conductive connector according to any one of claims 1 to 3 and 5, wherein the elastic polymeric substance forming the elastic

anisotropically conductive films has tear strength of at least 8 kN/m.

7. (Amended) The anisotropically conductive connector according to any one of claims 1 to 3, 5 and 6, wherein the coefficient of linear thermal expansion of the frame plate is at most $3 \times 10^{-5}/K$.

8. (Amended) A conductive paste composition suitable for forming the elastic anisotropically conductive films in the anisotropically conductive connector according to any one of claims 1 to 3 and 5 to 7, which comprises:

curable liquid silicone rubber and conductive particles obtained by coating the surfaces of core particles exhibiting magnetism with a high-conductive metal, wherein a proportion of the high-conductive metal to the core particles in the conductive particles is at least 15 % by mass, and the thickness t of the coating layer formed of the high-conductive metal, which is calculated out in accordance with the equation according to claim 1, is at least 50 nm, and

wherein the liquid silicone rubber is such that a cured product thereof has a compression set of at most 10% at 150°C and a durometer A hardness of 10 to 60.

9. (Deleted)

10. (Amended) A probe member suitable for use in conducting electrical inspection of each of a plurality of integrated circuits formed on a wafer in a state of the wafer, which comprises:

a circuit board for inspection, on the surface of which inspection electrodes have been formed in accordance with a pattern corresponding to a pattern of electrodes to be inspected of the integrated circuits formed on the wafer, 5 which is an object of inspection, and the anisotropically conductive connector according to any one of claims 1 to 3 and 5 to 7, which is arranged on the surface of the circuit board for inspection.

11. The probe member according to claim 10, wherein 10 the coefficient of linear thermal expansion of the frame plate in the anisotropically conductive connector is at most $3 \times 10^{-5}/K$, and the coefficient of linear thermal expansion of a base material making up the circuit board for inspection is at most $3 \times 10^{-5}/K$.

12. The probe member according to claim 10 or 11, 15 wherein a sheet-like connector composed of an insulating sheet and a plurality of electrode structures each extending through in a thickness-wise direction of the insulating sheet and arranged in accordance with a pattern 20 corresponding to the pattern of the electrodes to be inspected is arranged on the anisotropically conductive connector.

13. A wafer inspection apparatus for conducting 25 electrical inspection of each of a plurality of integrated circuits formed on a wafer in a state of the wafer, which comprises the probe member according to any one of claims 10 to 12, wherein electrical connection to the integrated

circuits formed on the wafer, which is an object of inspection, is achieved through the probe member.

14. A wafer inspection method comprising electrically connecting each of a plurality of integrated
5 circuits formed on a wafer to a tester through the probe member according to any one of claims 10 to 12 to perform electrical inspection of the integrated circuits formed on the wafer.